

SMUG BYTES

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THIS MONTH:

- The Limits Of Computer Intelligence-Dr. L. Dreger
 - Meeting Notes
 - Rudy's SQ Notes
 - Presidents Program
 - And Other Great Things

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* SEE YOU THERE

- * Send all contributions by the
- * 3rd Wednesday of the month to:

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The Limits Of Computer Intelligence II

by Dr. Lloyd Dreger

Editors note: This is the talk Dr. Dreger gave at the '90 Expo. Also because of the length of the article it will run in the next four issues of SMUG Bytes. This is the 4th part.

Neural connections do form feedback loops that can keep iterative processing going indefinitely. Our brains process data not only while sleeping but also while under anesthesia or in a coma. As any psychologist will tell you, we don't have to be conscious of what we think. Only when a stimulus becomes strong enough so it can demand attention will we become conscious of it. That is probably why certain thoughts arise to conscious attention when we relax a bit as when resting or before falling asleep or sleeping. But because man is a very well trained social animal certain thoughts can be continuously suppressed. Very painful memories seem

to be suppressed as well. Both these may be brought out under hypnosis which is really a form of brain relaxation.

All this is leading up to one conclusion. The brain is extremely complex. Since nobody wants his brain to be used as a guinea pig for experimentation, all discoveries about human brain function has had to come from people suffering from brain damage to certain areas of the brain and autopsies. The cerebral cortex has been mapped down to quite small areas of function containing millions of neurons. No one yet has found out the function of a particular neuron and mapped its interconnections. No one knows how many neurons are involved in going from a particular input to the final cognition of an idea. It is obvious that the incoming signals get processed for many different things simultaneously.

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The whole idea of brain simulation to achieve cognition seems several orders of magnitude too complex to be practical. There is something called complexity theory which states that orders of complexity increase as a power series of the number of levels of complexity and soon reach a state even multiple processing cannot reduce to a practical amount of time. Just because time doesn't make it practical. Brains do cause minds but the process is very complex not only in understanding it but also in simulating it. There has to be a simpler way as this approach has a very low probability of ever being practical. Most of AI has resulted in very expensive research papers and nothing more.

Conclusion 2: Any other system capable of causing minds would have to have causal powers equivalent to brains. Minds can think. We don't necessarily have to simulate neural brain patterns, all we have to do is simulate how we think. This line of attack has several advantages over brain simulation as it merely involves anyone looking at our learning processes. At the same time we could just possibly gain some insights into achieving a better way of teaching.

We start with a new born baby whose mind is almost devoid of most everything except a system of biological built in instincts. Many so called instincts in ourselves and animals are not really built in but are learned and as such may require some rudimentary form of cognition. Walking, eye coordination, playing the piano etc. are some of these. Take playing the piano as an example. When we first start we have to think about which keys we have to hit and in what order and how long we have to hold those keys down which takes a lot of cerebral activity. With a lot of practice we get to a point where we don't know what keys we are playing but it just comes out and we achieve a smoother type of coordination then we could ever do thinking about every step. Control of playing a particular

piano piece has moved from the cerebrum to the cerebellum. If for some reason we feel that we are misplaying a note, we go back into an active thinking mode and low and behold our smooth playing has once more degenerated into the jerky learning stage all over again. We can also gain some conscious control over some automatic body functions such as breathing and heartbeat.

As we pointed out above, human brains and many animal brains as well are not fully grown at birth. In addition, our bodies don't have the muscle strength to achieve two-legged walking until we first exercise those muscles for a year or so. We also need growing of brain interconnections to achieve the necessary coordination. This also includes speech which demands exacting control of the entire oral cavity and breath control. A lot of effort in those first few years goes into learning how to control our body.

But we digress. Babies are born with 5 senses. In a newborn the senses still need training (sight does require some ability to focus and all sounds are meaningless except familiarity to the mother's voice & heartbeat. The fetus has heard these for several months while in the womb, the pleasure center is more akin to being comfortable or uncomfortable. Comfortable also is associated with familiar --being born is a traumatic experience the familiar mother's heartbeat is suddenly gone which is the reason newborn babies should be held a lot so they again hear that familiar prenatal heartbeat to assure them that all is well. It is this pleasure/pain center which gives the mind the ability to experience. The powerful technique of reward and punishment as first demonstrated by Povlov's dogs now becomes a most powerful teaching technique. A baby gets hungry. This hunger is reflected in discomfort. The baby cries in response to this discomfort and gets fed. In a week or two when it has learned to focus its eyes, it notices that a specific face appears with the

food and soon relates the face to comfort and the feeding process. Much latter the face is related to pleasure (something more than just comfortable) and a lot of other feelings and sensations. Finally it relates the sound "mama" to the face. Still later, that the sound "mama" is one of a group of things with the sound called a word. This last is how simple concepts combine to form complex and abstract concepts. We leave it to the student to work out the relations involved in the following string of concepts: mama, mommy, mom, mother, a mother (requires consciousness of self), parent, family, clan, nation, race, mankind. All these different relationships stored in diverse portions of the brain are brought together to form the concept of the term "mama". Other senses also affect the pleasure/pain center to a lesser or greater degree in similar ways with similar cause/effect experiences.

Now, how do you reward or punish a computer? The ability to relate, not in the mathematical sense of equal as we pointed out earlier, but in a cause/effect relationship turns into experiences. The grand total of all experiences relating to a particular item result in the concept. The keywords or attributes associated with LISP and/or PROLOG suffer from one fatal fault--they are not experiences or something the computer can relate to. They thus remain meaningless.

The student will see from the above discussion how all the rest of man's thinking and reasoning can result. We should add one small point. The effect of pretending, aping, or mimicking is another way man can learn. Reading is still another way of experiencing. All are artificial forms of gaining experiences. This is especially true with learning speech. The babblings of a baby have sounds in them that are not in any language. By listening, the child tries imitating the adults around him. (It would be better not to talk baby talk to them as they just have to relearn. However, a 3 month

old baby would be a good source of nonsense syllables since adults become so well trained on words that they forget the nonsense stuff which had no meanings.) We usually do not think in terms of words but usually in terms of words but usually in terms of pictures where our visual area becomes a blank piece of paper we are writing on or where we are visualizing something concrete. During these times our eyes are seeing but it isn't being recorded as the recording section of the brain is busy with our idea. People sometimes have difficulty verbalizing their ideas as putting something we see into words is not always easy. Words and language are for communicating to others which can be another form of learning. The trouble with words is that they mean different things to different people and part of effective communication is to check from time to time to make sure our audience is using the same definition. Thoughts are fleeting in that they only exist for a few minutes at most (some say seconds or fractions of a second). Writing has helped mankind to retain these thoughts as a form of memory. People who are thinking usually write down a few words, or are drawing a picture to help them recall the train of thoughts later. The first written languages were pictograms like the well known Egyptian hieroglyphics. Phonic sounds are added as needed and in the case of Chinese and Japanese the various symbol elements become simplified. Despite this, these languages become too cumbersome to use so that eventually the phonic symbols win out. Simplifying the phonics into an alphabet where one or at most 2 letters represent a sound keeps everything down to a memorizable set. Then usage steps in and modifies the sounds so that an English, German and French "a" are not sounded the same and any resemblance to the original is purely accidental.

Now, how the brain, with its pleasure/pain center and its ability to associate, probably turns inputs into experiences and finally concepts,

becomes a bit clearer to understand in principal. In the process we have had to invoke feelings, awareness of self and even a social consciousness with ethical and moral implications. How the brain does this with processing of signals through complex neural pathways still remains puzzling.

George in discussing scientific problem solving techniques, states that language is essential as most problems are stated in words while concepts are represented by words and feelings. We have pointed out that it is this area where the computer is having all the trouble. Sometimes the problem has to be redefined and/or broken down into various sub-problems. The second step is hypothesizing and testing a theory or probable solution which of necessity requires picking the pertinent data, facts and concepts from a sea of all facts, data and concepts. Applying concepts sometimes requires setting down mathematical formula which change from one application to another of the same principal or concept. The human mind when working on a problem develops many hypotheses or solutions and in examination, rejects them or modifies them and sometimes reexamines previously discarded ones.

Sometimes in analysing a problem one has to develop new concepts as a "if only we could". Visualize Archimedes with the problem of the king's crown. In an era when Chemistry was still unknown, he had to discover a way to measure the volume of an irregular object without destroying it. While getting into a tub of water to take a bath and thus obviously not consciously thinking of his problem, he discovered a basic principal of hydrostatics and immediately knew he had the missing method. We all have had periods of inspiration when intuition said we were right although we couldn't immediately prove it. Einstein used "thought experiments" to think through his theory of relativity. These experiments are still used to explain the implications of his theory today. Relativity not

only had to explain everything explained with Newton's theory of gravitation but also some facts which gravitation couldn't explain. It went further than explaining the exceptions but predicted certain other phenomena which weren't yet observed because nobody ever thought of looking for them. Expediency does not allow us (or the computer) looking for them. Expediency does not allow us (or the computer) to apply every concept we know to try and solve every problem we meet. We must carefully select only those that might apply. When does one apply the method of "reducto ad absurdum" --proving that everything else leads to contradictions so thus what we are trying to prove must be correct by default.

This is the true area of problem solving technique and thinking--analysis of a problem to find out what the real problem is, breaking a problem down into simpler solvable parts, selecting applicable principals and concepts to try, designing a hypothesis which explains everything that has to be explained, designing test which will prove or disprove the hypothesis, looking at the hypothesis further to see if there are other implications which may defeat or enhance the hypotheses over and beyond the immediate problem (as in the case of Relativity).

If we are going to have our computer and its algorithm do thinking we first have to have it truly understand words, concepts and principals (rules of thumb). Thus, until a computer can experience in a cause/effect way and make associations between experiences similar to that of man (or animal), even this thinking simulation approach to getting a computer to think also fails.

If a computer were ever designed to include the presently missing pleasure/pain center and the missing soft-logical element of association one would soon encounter problems where one would have to cope with the problems associated with the social

consciousness and its implied ethical and moral principals which now become part of the computers freedom to act as it sees fit. How you design a computer with these elements is left to the experts. The pleasure/pain

center has to be more than a set of flags as the computer now uses.

Proposition 3 thus, at present, remains true and computers won't be able to think on their own. We agree with Penrose, although in a different approach. The Emperor's New Mind is lacking something which prevents it from becoming a mind but keeps it merely a computer.

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Changeux, Jean-Pierre, Neuronal Man, Oxford University Press, 1985.
George, F. M., Problem Solving, Duckworth, 1980.

PRESIDENTS PROGRAM

Well the club just got the newsletters from the Chicago group. It seems their computer was down and were not able to get it printed for a while. They said they thought the next Sinclair Computer Fest/Expo would be in the great state of Indiana. Is this true? We the Sinclair users would like to know. Put me down for a ticket and SMUG for a table. I also suspect there will be at least 5 other tickets purchased for our group. In fact we will be there with bells on and would be glad to supply a speaker or two.

I have received my latest issue of Updates Magazine. It is well worth the price. I hope you subscribe to the magazine as not only is the information worth the price, but they need your subscription to survive. And "WE" as a Sinclair Family need them to keep us together.

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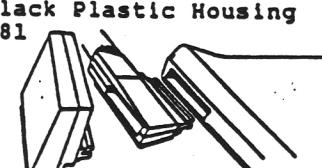
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In keeping with the "together" line what has happened to "SNUG"? They were going to combine newsletters and produce information on the Sinclair community for all members. Quite a few of us joined SNUG to help it help the "family". I think we need to here from SNUG.

Also notice the Vulcan publication, Computer monthly has no Sinclair section. Note it!!!

Up comming events: Sat Jan. 12. Waukesha County Expo. \$3 at the door.

GIGO OR IN OTHERWORDS THE MEETING

Well the meeting was sparsely attended but it was a great meeting. Read on and see why.

First Neal was unable to attend as he was sick with the flu. So his computer was missed. Along with Dick's. Dick didn't want to bring his with all the rough roads from the snow storm. This meant no modem training or demonstration.

Dick reported on the treasury, it is in good shape, and how the special projects are helping increase our finances.

Bill passed out a few letters for answering. We have been getting more letters since we send FOG a copy of our newsletter each month. Bill also reported on the nice book from Bob Shade, Philidelphia owner of our digitizer board. I will show or report on this information as it is a beautiful job.

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The final item for the night was a surprise visit from an prior member. None other than John Wells. John is running a local FIDO board and has a Sinclair node. He came to us to report on the board. I was not aware of the board and I want to try it. Please note it is a local call, if you live in the Milwaukee exchange, and they carry both messages and down loads. He reports that the boss sysop is going to drop the Sinclair node if more messages are not forthcoming. Give it a call. John also has a Genealogy node. If you are into that you can leave a message and can use searches in other parts of the country.

John's number for the Sinclair node is (414) 761-2582 and go to the "The City Of Flag's" BBS. The genealogy board is the same number but go to the "Genealogy's Done" board.

One final item is remember the January meeting is the start of the year and will require your dues payment for 1991. We do have the room for next year and need your help and support.

Also along with the dues you will be able to vote for the 1991 SMUG officers and directors. Also there will be a birthday treat on SMUG for SMUG.

Updated Program for QUILL.

Just got a newsletter from SECTOR SOFTWARE announcing an upgraded version of their program SPELLBOUND for QUILL. I use their spell checker all the time when using QUILL and find it great. According to them the cost is 50 pounds for the program or 30 pounds plus the original copy of SPELLBOUND. Also They have just released an Amiga to Z88 link. And plan to release a QL to Amiga and Atari ST to Z88 link. They also have some other interesting software. You can write to them at this address: SECTOR SOFTWARE, 39 Wray Crescent, Ulles Walton, Leyland, Lancashire, PR5 3NH. Phone 0772 452414.

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Lead letter from Robert Shade on the
Digitizer

S.M.U.G., P.O. Box 101, Butler WI,
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I have enclosed the following items
for your comments and advice.

1. listing of menu program - loader
for the video digitizing programs
I am using.
2. revisions for "EYE BY NIGHT"
program - revised for use with
the LARKEN disk system.
3. revisions for "VIDEOTEX" program
revised for use with the LARKEN
disk system.
4. revisions for "VIDEO 3-D"
program - revised for use with
the LARKEN disk system.
5. PRINT and MINIPRINT printouts
from the "VIDEOTEX" program of a
womans face.
6. PRINT and MINIPRINT printouts
from the "VIDEO 3-D" program of a
womans face.
7. summary of my initial video
digitising efforts, retouching
the digitized images with the
"ART STUDIO" program, and their

use with the "WORDMASTER"
program.

8. manufactures data for the video
camera I am using.
9. "WORDMASTER" program screen color
substitution patterns palette.
10. "WORDMASTER" program printouts of
the original B&W and retouched
and hand colored digitized video
images, one image per page.
11. "WORDMASTER" program printout of
the retouched and hand colored
digitized video images, printed in
B&W only, six images per page.
12. photocopies of the original
subjects used for making the
digitized video images.
13. "WORDMASTER" program printouts of
160 X 160 dot block, demoing the
aspect ratio changes produced by
selecting each of the printout
size options.
14. 160 x 160 block rescaled with the
"ART STUDIO" program and printed
with the correct aspect ratio
with the "WORDMASTER" program.

The rest of the letter refers to
LARKEN disk and ram usage.

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Editor and contact person is:
Bill Heberlein (414) 527 2191.

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The next meeting of SMUG will be held on:
Wednesday, January 2, 1990

6:00 Set Up
7:30 Business Meeting
9:00 MODEM continued

6:30 MODEM training using the QL
8:30 Elections - Who's The New Officer
10:30 Clean Up

Wednesday, February 6, 1991
6:00 Set Up
7:30 Business Meeting
9:00 MODEM continued
Location:
Equitable Savings and Loan,
145th and Capital Drive,
Milwaukee WI

6:30 MODEM training using the QL
8:30 Should Have Your SMUG Cup
10:30 Clean Up

December 1990

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SMUG Bytes